

IV. A Supplement to the account of the Pediculus Pulsatorius, or Death-Watch, in *Philos. Trans.* No 271. Serving to the more perfect natural History of that Insect. By the Reverend Mr W. Derham, F. R. S.

**T**He R. Society having so favourably received my former Account of the *Death-Watch*, as not only to publish it, but to require also my perfecting the History of that Insect, I think my self bound to comply, as far as I am able. And therefore I have procured a Draught to be made of that Insect, both as it appeareth to the naked Eye, and as magnified with a Microscope. [Fig. 4.] sheweth it as seen with the naked Eye: [Fig. 5.] as magnified.

These Figures, and only saying, it is very much like a *Louse* in Shape and Colour, but runneth more nimbly, may be a sufficient description of an Insect common in every House, in the warm months. For in the cold season of the Year, they hide themselves in dry obscure places, and are seldom seen.

*Of the Generation of the Death-Watch.*

Some time after their Copulation (of which by and by) they lay their Eggs in dry, dusty places, where they meet with least disturbance. For in such, and none else, I have found them. These Eggs are exceeding small, much smaller than the Nits of Lice; although Lice are not much bigger than our Insect is. These Eggs are white and shap'd like Nits, but more transparent.

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These (as the Eggs of all Insects that have fallen under my cognizance, are by the warmth of weather) these, I say, are hatched by the warmth of the approaching Spring, which is to them all one as an Incubation. About the beginning of *March*, or (if the weather be warm) sooner, if cold and unseasonable, later, the Insect is fully hatched, and can creep about.

At the first leaving their Egg-shell, they are exceedingly small, so as scarce to be discerned by the sharpest Eye, without the help of a Convex-Glass. I have with a Microscope seen them crawling about, but could scarce perceive any Hairs, Feet, &c. But they rather look'd like moving Eggs. I suppose they were covered with their Shells, and but just breaking out of them. At the first leaving their Shells they are lesser than their Eggs, altho the Eggs are scarce visible without a Microscope.

These young Death-Watches are perfectly like the Mites in Cheese, a few hairs of the Breech only excepted. I could not perceive any difference between them, when much magnified with a Microscope, but only that Mites have more Bristles about their Breech.

In this Shape they continue 6 weeks, or 2 months, feeding on divers things they can meet with. They being (as I said) so very like Mites, I cannot positively say, but have great reason to think, that they were swarms of young Death-Watches, which I have seen feeding on dead Flies, and other things in *March*, *April* and *May*. Indeed they are a great annoyance to me, in devouring or defacing my Specimens of Insects. And there are scarce any sorts escape these voracious, tho minute Animals.

From this *Mite State*, they grow gradually to their more perfect State. When they become like the old ones, they are at first very small, and then can run about more swiftly, than when Mites, in which Mite state, they creep but slowly.

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Thus having traced the Generation of our Insect, through its several stages, and finding it to be as solemn and regular as any in Nature, even as that of an humane *Fætus* it self, I cannot easily pass over the business of *Equivocal Generation* without a reflection. If this Insect was ever taken notice of by the Ancients (as I do not find it was, either by them, and but little by the Moderns) they would, no doubt, have made its Production to be (like that of other Insects, *viz.*) out of Dust, or some other thing, in which its Eggs were laid. But as in this, so in the Generation of all other Insects, yea all Animals, it hath been observ'd, that Nature is very regular, and uniform, in deriving the Off-spring, not from corrupted Matter, but from Animal Parents of the same Species. The Digression would scarce be pardonable, or I should hardly forbear expatiating on what I have often with great Pleasure and Admiration seen of Natures procedure in the Generation of Insects particularly ; as for instance, *Gnats*. Tis wonderful to see in what curious and exact order the several Species of Gnats lay their Spawns. The curious and ingenious *Swammerdam*, and other Authors mention but two kinds of Gnats, but I have collected near 30 distinct Species of them, and have observed one Species to lay its Eggs in this, another in that, another in a third, and others in other Forms ; and I could not but admire to see how artificially the Spawns are tied in the Water ; how (after the Sun's Incubation, if I may so call it) the Spawn is dissolved, and the Eggs, with a part of the Gelly in which they were inclosed, fall to the bottom of the Water, and there stick on Stones and other things ; where they are hatched into *Nymphae*, as various as the Gnats themselves, some being red, green white or other colour'd Worms, some of quite a different Shape : and lastly, how these *Nymphae* become *Aureliae*, and then *Gnats*, both *Male* and *Female* of every Species.

But I find I am gotten into the Digression I proposed to avoid, and therefore (begging pardon) I shall return to our *Death-watch*. And the next point I shall consider, shall be

*Of the Noise, or Ticking, and Copulation of the Death-watch.*

In the Transaction before named, I have plainly shewed their *Ticking* noise to be a *wooing A&T*, and that it is commonly about *July*. I scarce ever heard them beat before *July*. But all, or the greatest part of *July* they beat, and in the beginning of *August*. I have heard them till *Aug. 16.* but never later. But they do not every year beat alike ; but sometimes sooner, sometimes later ; sometimes much, sometimes little ; according as the year exciteth or favoureth, or hindereth their venereal inclinations. Of which we have sufficient example in the last, and present year. The last year 1702 they ticked very much, scarce ever ceasing either day or night. But this year 1703 as little. And I have observed as great a difference in the fertility of other Insects the last, and this present year. And no doubt but the same befell our *Death-watch*. The most remarkable Difference, or at least the most perceivable was in Insects bred in the Waters. Of which I shall say a little, because it serveth to illustrate what I am saying about the *Death-watch*.

Now as to the Waters, it might be observed, that last year they extreamly abounded with Animalcules. You could hardly find any stagnating Water without many Animalcules of many sorts therein, visible even to the naked eye. And if you viewed but a small Drop thereof with a good Microscope, you might see very many more. So that the Water looked in a manner as if alive.

But this year I have found some, but very few of those Animalcules, either without or with a Microscope.

*Pediculi.*

*Pediculi Aquatici* (which *Swammerdam* calls *Pulices Aquatici Arborecentes*) which are seldom barren, were for instance less numerous in our Waters this last Summer, than the Summer before, by many myriads, or at least less venereally inclined, or less pregnant, as I judge; from their being vastly less numbers of them congregated together. For the reason of their assembling in such vast numbers, so as to discolour the Waters, I have discovered to be either for Venery, or to discharge their young at least out of the Receptacles wherein they were lodged, or to cast their *Exuviae*, or Skins, or for all together. For I have seen all these things performed at that time, if I mistook not.

Now as these most numerous fertil Insects, so our *Death-Watch*, in all probability, had its venereal Flames abated by the Indisposition of the present Year; and consequently (as I said) have click'd but little this year.

The reason of all which I take to be the Wet of the Spring-months, especially *May* and *June* last. In the former of which, there fell more Rain here at *Upminster*, than in any month of any year since 1696. This vast Wet might not only chill and spoil the Eggs of the Water-Insect, but also indispose the Air, and by some such means affects all other Insects, and render them less Prolifick.

And not only Insects, but even Corn it self, we have, to our cost, found to be less fruitful than than the Winter before gave us hopes of.

But 'tis time to leave this long, and I fear tedious account of the Noise of the *Death-Watch*, and proceed.

After that they have spent some time in terrifying their pusillanimous Hearers, and entertaining themselves with their Hymeneal Musick, they copulate. I do not remember that I ever found them in *Copulation*, till a week or fortnight after their *Ticking*. But 'tis very probable that they do copulate in the time of their *Ticking*, as I have formerly shewn the *Scarabaeus Death-Watch* to do.

*Of the Food of the Death-Watch.*

I have already said that the young *Death-Watches* feed upon dead Insect<sup>s</sup>, and the same I have seen the old ones do also, as also upon divers other things, *viz.* Bisket, Tallow, &c. nay, *Dust* it self (although it may seem to us an improper Food for such Animalcula) doth not escape the Palate of our *Death-Watch*. For which reason probably it is, that they delight most in dusty places, not in all; but such as are fouled with light Dust, such as flyeth in sweeping, and falleth on Shelves, and other places seldom brushed down.

But in this their eating *Dust*, there is one thing I have observed, which to me seems very remarkable, *viz.* their curiosity in choosing it. For they do not eat all that they meet with, but are very nice, and curious in selecting what suiteth best their Palate. I have seen them turn the Dust, and hunt among it with great pains and diligence.

From hence I conclude, that our *Death-Watch*, and other Creatures too that eat Dust, are not nourished by the pure terrene particles of Dust, but rather by more nutritive particles intermixed with Earth. For Dust contains very different particles, some of Earth, some the Powder of Animals, some Crumbs of Bread, Cheese and other Provisions reduced to Powder, some particles of Fruits, or our Spittle, Snot, &c. dried and reduced in like manner to Powder. Now these very Particles of the Dust, are doubtless what the *Death-Watch* hunteth after (like Ducks in Mud) when he turneth up, and diveth among heaps of Dust. Nay, so far probably is his Food from being corrupted, or fouled by the terrene particles, that it is perhaps better prepared, by thus being in Dust. Before in a Mass, in the body, it was more solid, and required the trouble of being gnawed out and masticated, but being thus in Powder, it is ready subtilized fit for deglutition.

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And although Dust to us seems to be nothing but Dirt pulverized, or if consisting of such Particles also as I have said, yet to be so blended and mixed with Dirt, as to be inseparable. But yet it is otherwise with our Insect. I have seen them through a Microscope, select the particles of Dust, and eat some and reject many others : Which they can easily do, being small themselves, and having accurate Organs of Sight, Smelling and Feeling, as well accommodated to-Dust, as the Organs of Ducks and Hogs are to find their Food in Dirt.

From this account of the Food of the *Death-Watch*, I cannot forbear digressing again, to note a common error about the food of such Creatures, as have been, or are thought to live upon things scarce nutritive of themselves. Thus the *Chamæleon* was thought to live upon the Air, when Flies are eaten by him: Fishes to live upon Water, or at least to satisfy a perpetual thirst therewith ; whereas their sucking Water is breathing, and their Food as little of Water perhaps, as other Creatures use. So *Earth-Worms* doubtless eat Earth, but in all probability it is Earth made of rotted Roots, Plants, or such nutritive things, not pure Earth. Nay, so necessary is good substantial Food to all Animals on this our Earth, that I am of opinion (from I think very good Reason) that there is no Animal but what hath its proper Food, even the most minute Insects whatsoever, and that also none of the four Elements, although therewith mixed. Concerning which (to save the trouble of enlarging this digression) an instance of mine may be found of the *Food of Water-Animalcules*, which my very ingenious and learned Friend Mr Ray hath thought fit to publish this year in his late Edition of his excellent Book. *Of the Wisdom of God manifested in the Works of the Creation*, p. 431.

But to return to the Food of our *Death-watch*, or rather the time they abstain from Food ; which I suppose they do all the Cold Months. You may perceive them gone

gone into their *Latilula* very soon ; as soon, or sooner than the Swallows, where, doubtless, they live all the Winter without Food, as many other Animals do.

I said before they harbour all Winter in dry obscure places ; I have found them lying deep in undisturb'd Dust, but never in shallow Dust, as tho' they had a foresight of the danger and inconveniences of cold Frosty weather.

Thus, in obedience to the commands of this August Society, I have (as far as I can) compleated my former account of the *Death-Watch*. But I fear I have trespass'd upon your patience too much by the length of this Narrative, and therefore think it time to conclude. But only I desire a word or two more, in answer to something I met with, since my penning this, in the *Athenian Oracle*, which I think my self oblig'd to take notice of. In the Question 'tis plainly the noise of the *Pediculus Pulsatorius* which is describ'd. But the answer is by no means right. The ingenious Gentlemen of that Society say, They enquir'd into such a Noise, found a little hole eaten in the Wall, that with a Paper Trap they catch'd the Insect, which they concluded made the Noise, and that it was a small sort of Spider. But I have been my self so often impos'd upon in the same nature, before I actually saw the truth, that I assure my self those *Athenian Gentlemen* were so also. I have in hunting the Noise sometimes discover'd a Spider near, sometimes the small *Scarabæus lignivorus*, which eateth the little holes in the Wood, which hath been commonly taken for the *Death-Watch*. These I guest might make the clicking noise, and therefore with all nicety watch'd them. But found that altho' the beating continu'd, the Insects did not stir in the least, nor were any way affected : So with all diligence I still pursu'd my enquiry, which was the cause of my discovering the real thing. And I have so many years acquainted my self with all the noises of the *Death-Watch*

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kind, that (altho I seldom love to speak confidently, yet) I can assure every one that there are but two sorts of them in those parts of England where I have been, viz. the few quick beats of the *Scarabæus Sonicephalus* as *Swammerdam* hath nam'd it describ'd by Mr *Allen*; and the longer and more leisurely Beats of that Insect I have now been speaking of. There are indeed *Scarabæi*, Grass-hoppers, Crickets, &c. which make peculiar noises. But there are no Creatures which make these regular clicking noises (like the Beats of a Pocket-Watch) but only that *Scarabæus Sonicephalus*, and our *Pediculus Puisatorius*.

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IV. *Defectus Lunæ Observatio, die Solis 12° Decembris, habita prope Mercatorium Regium Londini, a J. Hodgson R. S. S. tempore matutino, A. 1703.*

**D**arato Telescopio pedum duodecim longitudine eoque ad altitudinem idoneam sublato hora quarta matutina, non levis mihi affulsit spes, fore, ut ipsum Eclipsois inirium perciperem, quia etsi Cœlum non plane esset ferentum, Nubes tamen adeo erant tenues ut ipsum Lunæ limbum facile cernerem, & per intervalla quædam præcipue Lunæ maculæ distincte conspiciebantur, sed 20 min. aut circiter post quartam densæ nubes obortæ sunt ; quæ cum ferrentur a plaga Cœli que est inter occidentem & Austrum, versus partem oppositam ita Lunam obtexerunt ut mihi nullomodo conspicua fuerit nisi 35 min. post quartam tunc enim inconspectum meum recessit, & mihi visus est tantus ab Orientali ora defectus quantum fieri potuit 3 aut 4 minutis horariis ab ingressu primo in umbram numeratis, ejus maculas sat distincte percipere non potui, ad decernendum qua parte illa dilituum pati cœpit, nec licuit per tempus Eclipsois quantitatem dimetiri ; sed 4 min. post

Fig : 5 -

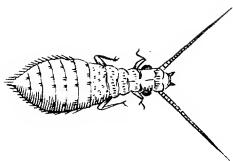
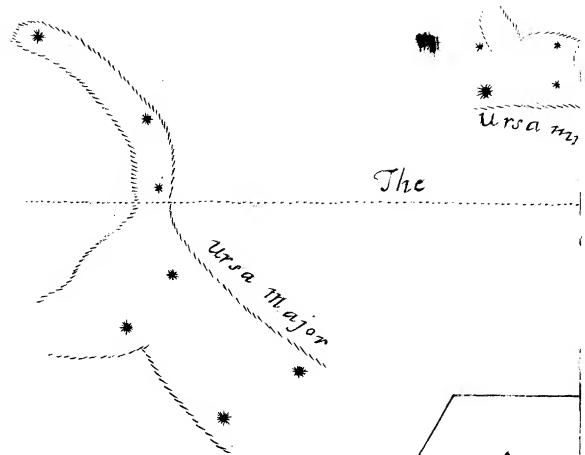


Fig : 4 -



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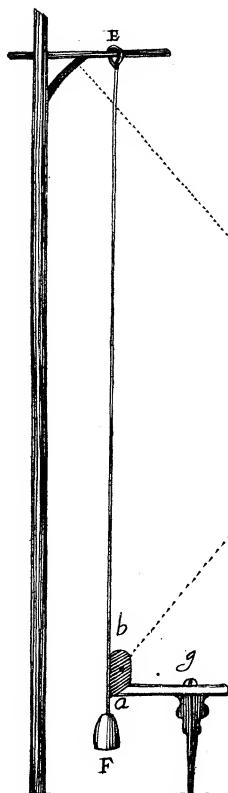
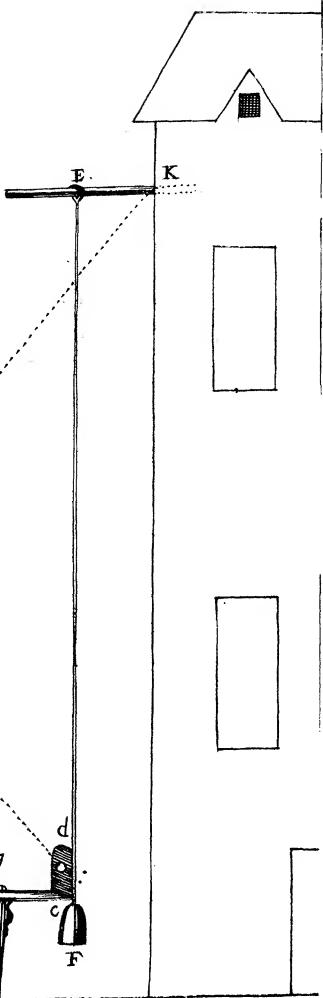


Fig : 2 -



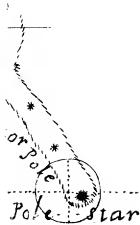


Fig : 3 -  
meridian

